

The invention claimed is:

1. A catalyst for the selective hydrogenation of unsaturated compounds comprising a supported catalyst comprising (1) Pd or a Group 8 metal comprising Pd and one other Group 8 metal and (2) at least two metals selected from Ag, Zn or Bi.

2. The catalyst according to claim 1 comprising Pd and one other Group 8 metal.

3. The catalyst according to claim 2 wherein said Group 8 metal is selected from Pt, Ir, Ru, Co or Ni.

4. The catalyst according to claim 1 comprising Ag and at least one of Zn or Bi.

5. The catalyst according to claim 1 wherein said catalyst is on a support which is highly porous having average pore diameter larger than about 180Å, no pores narrower than 35 Å, total pore volume larger than about 0.65 cc/g, and preferably less than about 100 m<sup>2</sup>/g BET surface area.

6. The catalyst according to claim 1 comprising K.

7. The catalyst according to claim 1 wherein Pd is in the range of 0.005 to 1% by weight; Ni is in the range of 0.0 to 15% by weight; Ag is in the range of 0.002 to 20% by weight; Zn is in the range of 0 to 5% by weight and Bi is in the range of 0 to 5% by weight.

8. The catalyst according to claim 1 wherein Pd is in the range of from 0.01% to 0.3% by weight; Ni is in the range of from 0 to 10% by weight; Ag is in the range of 0.005 to 5% by weight; Zn is in the range of 0.002 to 1% by weight and Bi is in the range of 0.01 to 3% by weight.

9. The catalyst according to claim 6 wherein the content of K is less than 0.5 % by weight.

10. The catalyst according to claim 5 wherein said support is alumina having a BET surface area of 10 to 100 m<sup>2</sup>/g.

11. The catalyst according to claim 10 wherein said support has a BET surface area of 20 to 70 m<sup>2</sup>/g.

12. The catalyst according to claim 5 wherein said alumina support is of shaped transition alumina having an apparent bulk density of between

07-0.8 g/cm<sup>3</sup> and having mixed crystalline forms of  $\alpha$ ,  $\kappa$ ,  $\theta$ ,  $\delta$ ,  $\rho$ ,  $\eta$ ,  $\gamma$ , and  $\chi$ .

13. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 1, to selectively hydrogenate acetylenes, diolefins, or olefins.

14. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 2 to selectively hydrogenate acetylenes, diolefins, or olefins.

15. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 3 to selectively hydrogenate acetylenes, diolefins, or olefins.

16. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 5 to selectively hydrogenate acetylenes, diolefins, or olefins.

17. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 7 to selectively hydrogenate acetylenes, diolefins, or olefins.

18. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 8 to selectively hydrogenate acetylenes, diolefins, or olefins.

19. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 11 to selectively hydrogenate acetylenes, diolefins, or olefins.

20. A process for the selective hydrogenation of unsaturated compounds comprising contacting a feed containing unsaturated compounds comprising acetylenes, diolefins and olefins in at least partial liquid phase with hydrogen in the presence of a catalyst according to claim 12 to selectively hydrogenate acetylenes, diolefins, or olefins.